

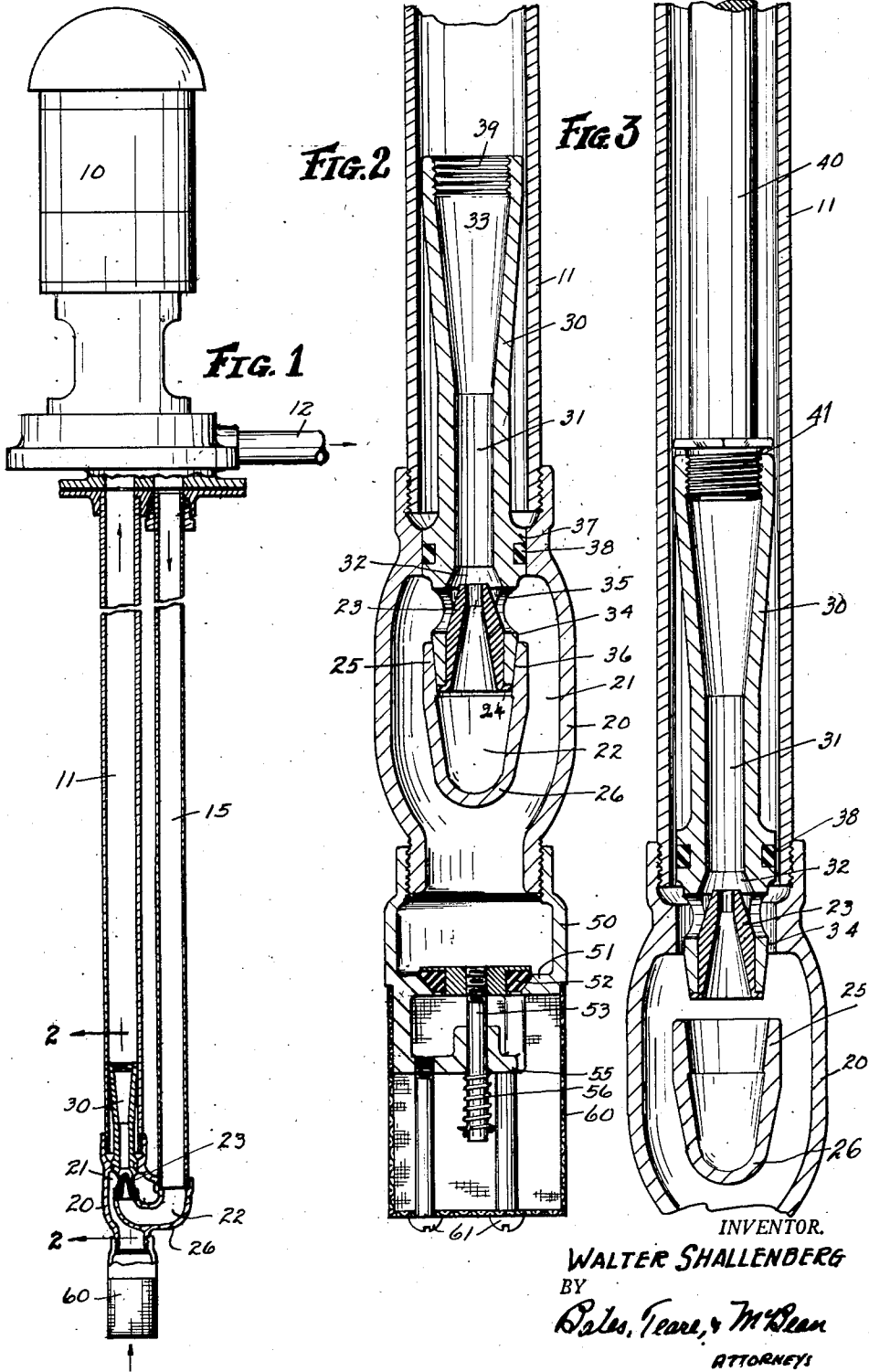
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W. SHALLENBERG

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PUMPING DEVICE

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INVENTOR.
WALTER SHALLENBERG
BY
Rales, Teare, & McLean
ATTORNEYS

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PUMPING DEVICE

Walter Shallenberg, Salem, Ohio, assignor to The Deming Company, Salem, Ohio, a corporation of Ohio

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This invention relates to an improvement in the jets of deep well pumps. Such jets, located in the well and supplied with liquid under pressure from the pumping mechanism above the ground and forcing such liquid upwardly in the suction pipe leading to the pump, have been found quite satisfactory when installed. A difficulty has developed, however, that when the jet nozzle or the jet tube into which it discharges becomes clogged with dirt it was necessary to pull out of the well the suction pipe, the pressure pipe (if an external pipe is employed) and the jet body in order to allow access to the jet nozzle or jet tube. The same situation arose where it was found desirable to change the size of an installed nozzle or tube.

The object of this invention is to avoid the difficulty mentioned by providing a jet nozzle and jet tube so constructed and mounted that they may be readily withdrawn through the suction pipe without disturbing either the suction pipe or the pressure pipe or the jet body which contains the suction and pressure passageways to the tube and nozzle. The means by which I accomplish this result is illustrated in the drawing hereof and is hereinafter more fully described.

In the drawing, Fig. 1 is a sectional side elevation partly broken away of a pump with a suction pipe, an external drive pipe and my improved jet; Fig. 2 is an enlarged vertical section in a plane indicated by the line 2—2 on Fig. 1 and on a larger scale; Fig. 3 is a vertical section on the same plane as Fig. 2 showing the jet pipe and jet nozzle in the act of being withdrawn through the suction pipe.

In Fig. 1, 10 indicates any suitable pump supplied by a suction pipe 11 and discharging into a delivery pipe 12. Secured to the lower end of the suction pipe 11 is the jet body 20 which has within it a passageway 21 leading from the lower end of the jet body to the suction pipe, and another passageway 22 leading to the jet nozzle 23.

In Fig. 1, I have shown a pressure pipe 15, at the side of the pipe 11 communicating at its upper end with the discharge of the pump and at the lower end with the passageway 22 in the jet body. If desired, in place of a pipe 15 at the side of the suction pipe 11, one may employ a pipe surrounding the pipe 11 and utilizing the annular space between the two pipes as the conduit for the driving pressure, the annular space in this case communicating with a similar passageway 22 leading to the nozzle. Each form of pressure pipe is well known in practice and the

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showing of the pipe 15 in Fig. 1 is intended as an illustration of either form of pressure conduit. The nozzle 23 of the jet discharges into a pipe 30 provided with a passageway 31 which flares at the lower end as shown at 32 and at the upper portion as shown at 33. The nozzle 23 discharges directly into the passageway of the jet tube, and preferably enters it a short distance. The annular space around the nozzle allows water coming through the body passageway 21 to enter the jet tube and be boosted in its flow by the water under pressure discharging upwardly from the nozzle.

The construction so far described in general terms applies to the usual deep well jet. However, in the old form the nozzle is mounted rigidly in the jet body, usually by being threaded therein, and the jet pipe is also attached to the body frequently being screwed therein. In my invention, I depart from this usual construction by carrying the jet nozzle by the jet tube and mounting the jet tube removably in the body, thus enabling the jet tube and nozzle to be drawn upwardly as a unit out of the suction pipe without disturbing the suction pipe or the jet body or the drive pipe.

As shown in Figs. 1 and 2, the jet tube 30 has a tubular extension 34 at its lower end which carries the jet nozzle 23, there being lateral passageways 35 through the extension from the exterior to the space about the nozzle immediately adjacent the lower end of the jet pipe. The nozzle may be screwed or forced into the extension 34 but in any case is rigid therewith. It preferably has a flange 24 abutting the end of the tube extension.

The exterior of the extension 34 is made so that it may make a water-tight fit with the elbow 26 of the jet body. It can be screwed tightly into the body, or, as illustrated in the drawing, it may be slightly tapered or conical as shown at 36, this conical portion seating in a conical upper end 25 of the elbow 26, which has the passageway 22 conducting the liquid under pressure inwardly and then upwardly to the nozzle. The tapered or threaded joint acts as a seal between the pressure and suction, though the jet tube is removable upwardly with the nozzle.

The jet tube is provided with an annular enlargement 37 near its lower end, the periphery of which fits within a cylindrical wall in the upper portion of the jet body. This enlargement has an annular groove in which seats a packing 38 engaging the wall of the jet body and making a water tight connection therewith.

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It will be seen that the jet nozzle and the jet tube while mounted in the usual position and acting in the usual manner are removable upwardly as a unit by simply applying a pulling action to the jet tube. The jet tube has means for attachment of some pulling tool; for instance, the jet tube may be threaded on the interior at the upper end, as shown at 39. Then when it is desired to remove the jet tube and nozzle it is only necessary to lower into the suction pipe a pipe or rod threaded at its lower end which may be screwed into the thread 39. Such rod is shown in Fig. 3 at 40 with the threaded lower end 41 thereof screwing into the thread 39 of the jet pipe.

Fig. 3 shows the removable parts in the act of being removed, the withdrawing rod 40 having been attached and having moved both the jet tube and the jet nozzle upwardly, freeing both of them from the jet body. It will be seen therefore that in changing the nozzle or tube it is only necessary to provide access to the upper end of the suction pipe and then to insert the removing rod and screw it into the jet body and pull upwardly on the rod until the tube and nozzle are extracted, after which they may be cleaned or repaired and replaced, or a substitute supplied as desired.

A foot valve is normally used below the jet and I find it very convenient to carry the same by the jet body. I have shown a tubular extension 50 mounted on the lower end of the jet body 20 and having a transverse partition 51 with an opening providing a valve seat, I have shown a valve 52 coacting with this seat. The valve has a downwardly extending stem 53 slidably mounted in a suitable spider-like portion 55 of the extension, and a helical spring 56 surrounding the stem, and compressed between the spider 55 and a shoulder on the stem, tends to maintain the valve on the seat in addition to the action of gravity.

The same tubular extension 50 may, if desired, carry a screen as for instance the cup 60 shown in Figs. 1 and 2. This cup may be conveniently held in place by screw bolts 61 (Fig. 2) screwing into the spider 55.

I claim:

1. In a jet construction for a deep well pump-

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ing system, the combination of a jet body having a suction passageway with a cylindrical opening adjacent the upper end, a pressure passageway terminating in a conical opening axially aligned with said cylindrical opening, and a unitary jet tube and jet nozzle removably mounted in both passageways, said jet tube having a cylindrical enlargement with an annular groove, packing seating in the groove and bearing against the cylindrical opening of the body, said tube having an extension externally conical to make a tight connection with said conical opening and having an internal bore, the nozzle tightly seating in said bore and having an external flange engaging the lower end of the extension, there being a lateral opening in the extension, at the side of the nozzle communicating with the entrance to the tube.

2. The combination with a suction pipe and a pressure conduit of a jet body secured at its upper end to the suction pipe, an extension secured at the lower end of the jet body and carrying a foot valve, the jet body having two passageways, one connecting the space above the foot valve with the suction pipe and the other connecting an internal space with the pressure conduit, a jet tube removably mounted in the jet body, a jet nozzle carried by the tube, the tube being in communication with the suction passageway in the body and the nozzle in communication with the pressure passageway in the body, the jet tube and nozzle being withdrawable as a unit through the suction pipe.

WALTER SHALLENBERG.

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